

Technical Solution Sheet 98.02

98: Solar Installation

Duplicate solution of 6.06 (Hot Water Plumbing) – Applies from 19 April 2013

Solar Hot Water Performance Requirements

AIM

The aim of this technical solution is to clarify the requirements for determining satisfactory performance of a solar water heater system.

PLUMBING REGULATIONS 2008

The Plumbing Code of Australia (PCA) is adopted by and forms part of the *Plumbing Regulations 2008*. Part B2 of the PCA specifies the objectives and performance requirements related to the installation of heated water services. [AS/NZS 3500.4:2003 Plumbing and drainage Part 4: Heated water services](#), is a “Deemed-to-Satisfy” document listed in Part B2 of the PCA and contains a section on “Installation of solar water heaters”.

The 6 Star requirements as set out in the Victorian variation to the energy provisions of the *Building Code of Australia* provide that, in the case of a new Class 1 building, either a rainwater tank connected to all sanitary flushing systems or a solar water heater system is to be installed in accordance with the *Plumbing Regulations 2008*.

DETERMINING PERFORMANCE

The optimal orientation of a solar collector is north facing with an inclination angle of 35°. At any other orientation or inclination the performance will degrade, though often only slightly. Therefore, systems with higher performance must be chosen to make up for performance degradation due to non-optimal orientation in order to ensure minimum annual energy savings of 60 %.

Figure 1 shows the required performance of a solar hot water system, at a range of orientations and inclinations, to achieve the same performance as an optimally orientated system with 60 % annual energy savings.

The horizontal axis shows the orientation in degrees from magnetic North. Easterly orientations are positive, Westerly orientations are negative. The vertical axis shows the inclination of the solar collector in degrees from the horizontal.

The shaded zones on the graph show the required performance for any collector orientation and inclination necessary to make up for performance degradation due to non-optimal collector orientation and/or inclination.

The hatched area (depicted as the Regulation Compliance Zone) shows the performance zone defined in the regulations, which is defined as having an orientation between -60° and +30° from magnetic North and an inclination between 15° and 55° (see Figure 1).

PERFORMANCE REQUIREMENT

The annual energy savings of a solar water heater is evaluated generally at one orientation and an inclination angle using [AS/NZS 4234](#). The impact on performance of variation from that orientation and inclination can be evaluated from Figure 1.

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Note:

To confirm a solar water heater meets the minimum 60% annual energy savings please refer to the Victorian Energy Efficiency Target, Essential Services Commission website:

<https://www.veet.vic.gov.au/Public/ProductRegistrySearch.aspx>.

The website allows you to search for solar hot water systems that have a minimum 60% annual energy saving.

Under the “VEET Activity” drop down menu, select:

- “1F & 3B - Water Heater - Gas/LPG Boosted Solar” for a list of gas boosted solar hot water systems; or
- “1E - Water Heater - Electric Boosted Solar or Heat Pump” for a list of electric boosted and or heat pump water systems.

Note that under the Plumbing Regulations 2008, if a reticulated gas supply from a gas company is available for connection to the building, the solar water heater—

1. must be a gas boosted solar water heater if it incorporates booster heating and is not a heat pump water heater; and
2. if it is a heat pump water heater, no part of the heater that is capable of heating water must be capable of being connected to the mains electricity supply for that part of the heater to operate.

Calculating the energy performances

To work out the minimum performance required for a solar hot water systems where installed outside the regulation compliance zone refer to the following steps.

1. Determine the orientation of the solar collectors on the roof in degrees from magnetic North using a compass or off the plan.

2. Determine the inclination of the solar collectors.

3. Using the graph (Figure 1), find the required minimum performance requirements for the installed solar hot water system by determining the intersection of the collectors’ orientation and inclination.

Example 1 (Blue Line)

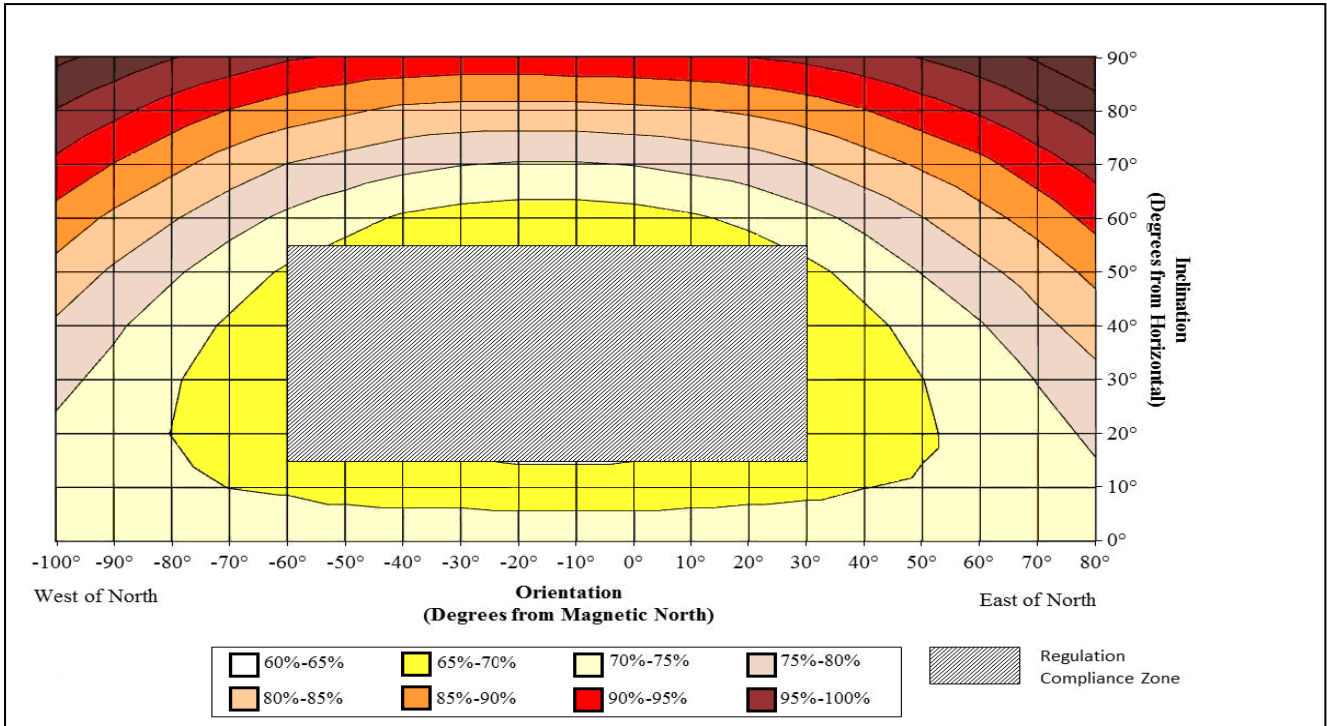
The solar collectors are mounted at a roof pitch angle of 22°, facing 20° East of magnetic North. This is inside the Regulation Compliance Zone. Looking up 22° inclination on the vertical axis, and +20° on the horizontal axis, shows the system is required to have an annual energy savings performance of at least 60% (see Figure 2).

Example 2 (Red Line)

The solar collectors are mounted on a frame at an angle of 40°, facing 90° West of magnetic North (i.e. due West on a compass). This is outside the Regulation Compliance Zone (see Figure 2). Compliance can also be achieved by looking up 40° inclination on the vertical axis, and -90° on the horizontal axis. This shows that the solar water heating system to be installed needs to have a minimum performance of 75% - 80% solar savings (see Figure 2)

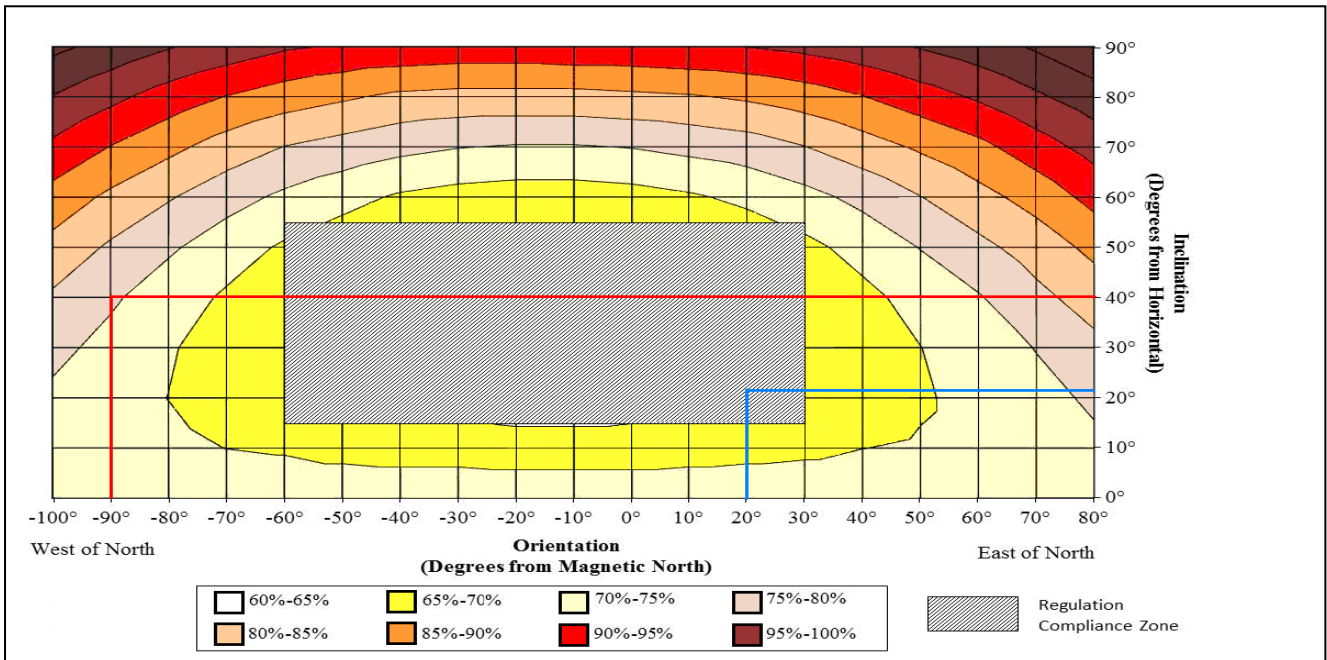
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FIGURE 1 - REQUIRED SOLAR HOT WATER SYSTEM PERFORMANCE AT VARIOUS INCLINATIONS AND ORIENTATIONS



Note: 60 - 65 % falls within the Regulation Compliance Zone

FIGURE 2 - REQUIRED SOLAR HOT WATER SYSTEM PERFORMANCE AT VARIOUS INCLINATIONS AND ORIENTATIONS



Note: 60 - 65 % falls within the Regulation Compliance Zone